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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,302	02/12/2004	Chun-Po Chen	JCLA10577	7413

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EXAMINER	
TSAI, SHENG JEN	
ART UNIT	**PAPER NUMBER**
2186	

DATE MAILED: 08/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/779,302	CHEN, CHUN-PO	
	Examiner	Art Unit	
	Sheng-Jen Tsai	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-20 are presented for examination in this application (10,779,302) filed on February 12, 2004.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Grummon et al. (US 6,341,341).

As to claim 1, Grummon et al. disclose **a storage system** [figure 1] **with a snapshot-backup capability** [System and Method for Disk Control with Snapshot Feature Including Read-Write Snapshot Half (title); figure 2 shows the backup application (204)] **electrically coupled to a main system** [figure 1 shows the main system (100)], **comprising**:

a storage device [figure 1 shows a plurality of storage devices in the form of on-line disk] **including at least a first data block** [the corresponding first block is the read-write on-line container (figure 2, 210); The on-line storage devices on a computer are configured from one or more disks into logical units of storage space referred to herein as "containers." Examples of containers include volume sets, stripe sets, mirror sets, and various Redundant Array of Independent Disk (RAID) implementations (column 1, lines 30-35)] **and a second data block** [the corresponding second block is the backing

store container (figure 2, 212)] **in response to the first data block** [figure 2 shows the relationship between the read-write on-line container (figure 2, 210) and the backing store container (figure 2, 212)]; **and**

a storage controlling unit [the corresponding storage controlling unit is the I/O subsystem (figure 1, 112; figure 2, 112) comprising a container manager (figure 1, 201) and a container layer (figure 1, 200)] **for receiving at least a newly stored data transmitted from the main system** [figure 1 shows that data to be stored originates from the memory unit (figure 1, 106) of the main system (figure 1, 100) and enters the on-line disks via the I/O subsystem (figure 1, 112); if the request is a storage request (i.e., data to be written into the storage devices) ... (column 6, lines 23-36)] **in accordance with distribution of each data in said data blocks of the storage device** [When a software process issues an I/O request, the operating system accepts the I/O request and translates it into an I/O request bound for a particular device. The operating system sends the I/O request which includes, inter alia, a block number for the first block of data requested by the application and also a pointer to a Device Switch Table entry which points to a container driver for the container where the requested data is stored. The container driver accesses the Container Array entry for pointers to the data structures used in that container and to Partition Table entries for that container. Based on the information in the data structures, the container driver also accesses Partition Table entries to obtain the starting physical locations of the container on the storage devices. Based on the structures pointed to by the Container Array entry and partition structures in the Partition Table, the container driver sends the

I/O request to the appropriate disk drivers for access to the disk drives (column 2, lines 26-43)], **determining whether there is any difference found between the newly stored data and at least a previously stored data located in the first data block** [However for all I/O requests to modify data in a read-write container, the container manager first determines whether the requested block of data has been modified since the time of the snapshot (column 3, lines 32-35)], **thereby backing up each different previously stored data from the first data block to the second data block** [If the request is a storage request, the system checks the modified-bit-map table 214 to determine if the read-write container's block of data was modified after the snapshot container 208 was created. If the block has been modified, the modified bit is set. Therefore, the snapshotted container 206 forwards the I/O request to the read-write on-line container 210 driver. If however, the block was not modified after snapshot container 208 was created, the container manager copies the unmodified block from the read-write container 210 to the backing store container 212 through the backing store container driver 212. The container manager sets the modified-bit-map table 214 for that block, and sends the I/O request to the read-write container 210 driver for storage in the read-write container 210 (column 6, lines 23-36)], **and then storing the corresponding different newly stored data to the first data block where the different previously stored data is located as long as there is any one different data found between the newly and previously stored data** [If the request is a storage request, the system checks the modified-bit-map table 214 to determine if the read-write container's block of data was modified after the snapshot container 208 was

created. If the block has been modified, the modified bit is set. Therefore, the snapshotted container 206 forwards the I/O request to the read-write on-line container 210 driver. If however, the block was not modified after snapshot container 208 was created, the container manager copies the unmodified block from the read-write container 210 to the backing store container 212 through the backing store container driver 212. The container manager sets the modified-bit-map table 214 for that block, and sends the I/O request to the read-write container 210 driver for storage in the read-write container 210 (column 6, lines 23-36)].

As to claim 2, Grummon et al. teach that **the storage device is as a multi-storage-disk array** [figure 1 shows a plurality of storage devices in the form of on-line disk].

As to claim 3, Grummon et al. teach that **the distribution of each data stored in said data blocks of the storage device is recorded in a block-mapping table** [The operating system 104 sends I/O requests to a I/O subsystem 112 which, in turn, converts the logical addresses into physical locations in the storage devices 116 and commands the latter devices to engage in the requested storage or retrieval operations. The I/O subsystem 112 configures the partitions of the physical storage devices 116 into containers and stores container configuration tables in the container layer 120 of the I/O subsystem 112. Container configuration enables the system administrator to partition a disk drive into one or more virtual disks. A container manager 118 operates in association with the I/O subsystem 112 (column 5, lines 35-45); When a software process issues an I/O request, the operating system accepts the

I/O request and translates it into an I/O request bound for a particular device. The operating system sends the I/O request which includes, inter alia, a block number for the first block of data requested by the application and also a pointer to a Device Switch Table entry which points to a container driver for the container where the requested data is stored. The container driver accesses the Container Array entry for pointers to the data structures used in that container and to Partition Table entries for that container. Based on the information in the data structures, the container driver also accesses Partition Table entries to obtain the starting physical locations of the container on the storage devices. Based on the structures pointed to by the Container Array entry and partition structures in the Partition Table, the container driver sends the I/O request to the appropriate disk drivers for access to the disk drives (column 2, lines 26-43)].

As to claim 4, Grummon et al. teach that **the backup process of the different previously stored data of the first data block to the second data block is recorded in the block-mapping table** [The operating system 104 sends I/O requests to a I/O subsystem 112 which, in turn, converts the logical addresses into physical locations in the storage devices 116 and commands the latter devices to engage in the requested storage or retrieval operations. The I/O subsystem 112 configures the partitions of the physical storage devices 116 into containers and stores container configuration tables in the container layer 120 of the I/O subsystem 112. Container configuration enables the system administrator to partition a disk drive into one or more virtual disks. A container manager 118 operates in association with the I/O subsystem

112 (column 5, lines 35-45); When a software process issues an I/O request, the operating system accepts the I/O request and translates it into an I/O request bound for a particular device. The operating system sends the I/O request which includes, inter alia, a block number for the first block of data requested by the application and also a pointer to a Device Switch Table entry which points to a container driver for the container where the requested data is stored. The container driver accesses the Container Array entry for pointers to the data structures used in that container and to Partition Table entries for that container. Based on the information in the data structures, the container driver also accesses Partition Table entries to obtain the starting physical locations of the container on the storage devices. Based on the structures pointed to by the Container Array entry and partition structures in the Partition Table, the container driver sends the I/O request to the appropriate disk drivers for access to the disk drives (column 2, lines 26-43)].

As to claim 5, Grummon et al. teach that **the storing process of the corresponding different newly stored data to the first data block is recorded in the block-mapping table** [The operating system 104 sends I/O requests to a I/O subsystem 112 which, in turn, converts the logical addresses into physical locations in the storage devices 116 and commands the latter devices to engage in the requested storage or retrieval operations. The I/O subsystem 112 configures the partitions of the physical storage devices 116 into containers and stores container configuration tables in the container layer 120 of the I/O subsystem 112. Container configuration enables the system administrator to partition a disk drive into one or more virtual disks. A

container manager 118 operates in association with the I/O subsystem 112 (column 5, lines 35-45); When a software process issues an I/O request, the operating system accepts the I/O request and translates it into an I/O request bound for a particular device. The operating system sends the I/O request which includes, inter alia, a block number for the first block of data requested by the application and also a pointer to a Device Switch Table entry which points to a container driver for the container where the requested data is stored. The container driver accesses the Container Array entry for pointers to the data structures used in that container and to Partition Table entries for that container. Based on the information in the data structures, the container driver also accesses Partition Table entries to obtain the starting physical locations of the container on the storage devices. Based on the structures pointed to by the Container Array entry and partition structures in the Partition Table, the container driver sends the I/O request to the appropriate disk drivers for access to the disk drives (column 2, lines 26-43)].

As to claim 6, Grummon et al. teach that **the storage controlling unit includes at least a chip controller and an embedded driver software** [the corresponding storage controlling unit is the I/O subsystem (figure 1, 112; figure 2, 112) comprising a container manager (figure 1, 201) and a container layer (figure 1, 200); Each container is controlled by an associated container driver that processes I/O requests for that container. For the purposes of this description the driver is assumed to be present on the container or within an associated application or on the adapter for controlling the RAID functionalities. Furthermore the adapter, drivers and other functionalities of this

system can be implemented as hardware, software or a combination of both. When referring to a given container herein (for simplicity), the description thereof is also deemed to include the associated driver and other required adapter functionalities (column 5, lines 59-67); further, figure 1 shows that the I/O subsystem (112) directly controls the memory chip (106), hence performing the functions of a chip controller to control the memory chips].

As to claim 7, refer to "As to claim 1" presented earlier in this Office Action.

As to claim 8, refer to "As to claim 2" presented earlier in this Office Action.

As to claim 9, refer to "As to claim 3" presented earlier in this Office Action.

As to claim 10, refer to "As to claim 4" presented earlier in this Office Action.

As to claim 11, refer to "As to claim 5" presented earlier in this Office Action.

As to claim 12, refer to "As to claim 6" presented earlier in this Office Action.

As to claim 13, refer to "As to claim 1" presented earlier in this Office Action.

As to claim 14, refer to "As to claim 2" presented earlier in this Office Action.

As to claim 15, refer to "As to claim 3" presented earlier in this Office Action.

As to claim 16, refer to "As to claim 4" presented earlier in this Office Action.

As to claim 17, refer to "As to claim 5" presented earlier in this Office Action.

As to claim 18, refer to "As to claim 6" presented earlier in this Office Action.

As to claim 19, refer to "As to claim 1" presented earlier in this Office Action.

As to claim 20, refer to "As to claim 1" presented earlier in this Office Action.

3. ***Related Prior Art of Record***

The following list of prior art is considered to be pertinent to applicant's invention, but not relied upon for claim analysis conducted above.

- Franklin, (US 6,061,770), "System and Method for Real-Time Data Backup Using Snapshot Copying with Selective Compaction of Backup Data."
- Sawdon et al., (US 6,748,504), "Deferred Copy-on-Write of a Snapshot."
- Kusters et al., (US 6,473,775), "System and Method for Growing Differential File on a Base Volume of a Snapshot."
- Kusters et al., (US Patent Application Publication 2004/0133602), "Optimizing Defragmentation Operations in a Differential Snapshotter."

Conclusion

4. Claims 1-20 are rejected as explained above.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheng-Jen Tsai whose telephone number is 571-272-4244. The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sheng-Jen Tsai
Examiner
Art Unit 2186

May 8, 2006

PIERRE BATAILLE
PRIMARY EXAMINER
8/23/06